APPENDIX 2-G

ALIGNMENT ALTERNATIVES AND STATION LOCATION OPTIONS ELIMINATED FROM FURTHER CONSIDERATION

ALIGNMENT ALTERNATIVES AND STATION LOCATION OPTIONS ELIMINATED FROM FURTHER CONSIDERATION

2-G.1.1 San Francisco to San Jose

The alignment alternatives and station location options eliminated from further consideration in this corridor are described below (Figure 2.G-1).

2-G.1.1.1 Alignment Alternatives

- **US-101 Alignment Alternative**: From San Francisco (Transbay Terminal or 4th and King Terminal Station), this alignment alternative would follow the US-101 freeway alignment south to San Jose and be on an exclusive guideway in the US-101 corridor.

This exclusive guideway alignment would have major construction issues involving the construction of an aerial guideway adjacent to and above an active existing freeway facility while maintaining freeway traffic. Limited right-of-way in this corridor would require the extensive purchase of additional right-of-way and nearly exclusive use of an aerial structure between San Francisco and San Jose. In San Francisco, major new tunnel construction would be required.

The US-101 alignment alternative would require many sections of high-level structures to pass over existing overpasses and connector ramps, resulting in high construction costs and constructability issues that would make this alignment alternative impracticable. This alignment alternative would also require relocating and maintaining freeway access and capacity during construction. The aerial portions would introduce a major new visual element along the US-101 corridor that would have visual impacts (intrusion/shade/shadow) on the residential portions for this alignment alternative. In addition, the freeway has substandard features (e.g., medians and shoulders) in many places, and it is assumed that any room that might be available for HST facilities likely would be used by Caltrans to upgrade the freeway in these areas. Construction of the tunnel in San Francisco from the Transbay Terminal site to 17th Street would be difficult because most of the tunnel would need to be constructed using compressed air techniques in soft Bay-fill ground.

- **Caltrain Corridor Alignment Alternative (Exclusive Guideway):** From San Francisco (Transbay Terminal or 4th and King Terminal Station), this alignment alternative would follow south along the Caltrain rail alignment to San Jose. This alignment alternative would be on an exclusive guideway within the Caltrain corridor.

An exclusive guideway alignment would be impracticable in this area because it would have major construction issues and high capital costs involving the construction of an aerial guideway adjacent to and above an active existing transportation facility, while maintaining rail traffic. It would require the extensive purchase of additional right-of-way and nearly exclusive use of an aerial structure between San Francisco and San Jose.

The aerial portions of this alignment alternative would introduce a new visual element along the Caltrain corridor that would have visual impacts (intrusion/shade/shadow) on the residential portions of this alignment alternative. For the Caltrain exclusive guideway alignment, introduction of the elevated structure for the high-speed tracks and stations would also have adverse impacts on the suburban town centers along the Caltrain corridor (San Mateo, San Carlos, Redwood City, Menlo Park, Palo Alto, and Mountain View). Although the structure would generally be in a commercial area in these centers, it

would represent a physical barrier for land use and urban design. Construction of the tunnel in San Francisco from the Transbay Terminal site to 17th Street would be particularly difficult because most of the tunnel would need to be constructed using compressed air techniques in very soft Bay-fill ground. Although the Caltrain exclusive guideway alignment would provide faster potential travel times than any of the other alignment alternatives in this section, this alternative would have the most impacts on cultural resources and would be the least compatible with the existing and planned development on the Peninsula. Samtrans has formally commented that this alternative would not be compatible with its existing and planned Caltrain services and would not be feasible in its existing right-of-way.

- **I-280 Alignment Alternative (Exclusive Guideway)**: From San Francisco (Transbay Terminal or 4th and King Terminal Station), this alignment alternative would follow south along the I-280 freeway alignment to San Jose and be on an exclusive guideway in the I-280 corridor.

This exclusive guideway alignment would have major construction issues involving the construction of an aerial guideway adjacent to and above an active existing freeway facility while maintaining freeway traffic. Limited right-of-way in this corridor would require the extensive purchase of additional right-of-way and nearly exclusive use of an aerial structure between San Francisco and San Jose. The portion within the City and County of San Francisco is fully developed, and connecting the alignment alternative to Diridon Station in San Jose would require a guideway passing through developed portions of downtown San Jose. These areas would require considerable property acquisition.

The I-280 alignment alternative would require many sections of high-level structures to pass over existing overpasses and connector ramps (in particular at interchanges with Routes 17 (580), 85, and 92), resulting in high construction costs and constructability issues that would make this alignment alternative impracticable. This alignment alternative would also require relocating and maintaining freeway access and capacity during construction. The aerial portions would introduce a major new visual element along the I-280 corridor that would have visual impacts (intrusion/shade/shadow) on the residential portions, nature preserves, and scenic areas for this alignment alternative. In addition, the freeway has substandard features (e.g., medians and shoulders) in many places, and it is assumed that any room that might be available for HST facilities likely would be used by Caltrans to upgrade the freeway in these areas. The considerable earthwork and retaining walls needed through Palo Alto and Woodside would have potentially significant impacts to nature preserves. The I-280 corridor would not allow a convenient connection to San Francisco International Airport from the south—the alignment alternative would have to leave the freeway corridor and pass through Hillsborough and Burlingame to provide access to the airport. For these reasons, the I-280 corridor is not considered to be a practicable alternative for HST service between San Jose and San Francisco.

2-G.1.1.1 Station Locations

The following station location options were considered and eliminated because they were located on alignment alternatives that were eliminated.

- **Millbrae–San Francisco International Airport (US-101).**
- **Redwood City (US-101).**
- **Santa Clara:** A potential link to San Jose International Airport would be at Santa Clara less than 3 miles north of the proposed downtown San Jose station location option. Because the downtown San Jose (Diridon) station site would provide sufficient connectivity to San Jose airport for the foreseeable future, the Authority has determined that the HST system would have no HST station at Santa Clara.

2-G.1.2 Oakland to San Jose

2-G.1.2.1 Alignment Alternatives

The alignment alternatives and station location options eliminated from further consideration in this corridor are described below (Figure 2.G-2 and Figure 2.G-2A).

- **Mulford Line Alignment Alternative:** From Oakland, this alignment alternative would follow south along UPRR's entire Mulford Line.

Using the most northern portion of the Mulford Line would be impracticable, having high capital costs and construction issues, because it is an existing narrow rail line that would need to be expanded to accommodate a proposed HST system. It would create substantial environmental impacts and have considerable potential for effects on social and economic resources and minority populations while being the least compatible with existing and planned development. This alignment alternative would require a portion of the UPRR corridor (that is generally 60 feet [ft] or 18.3 kilometers [km] wide) for aerial structure foundations and for an aerial easement over the tracks that would result in high visual impacts. In addition, a 50-ft (15.3-km) right-of-way strip would be needed from the residential, commercial, and light industrial areas to the east of the alignment alternative.

The southern portion of this alignment alternative goes through the Don Edwards National Wildlife Refuge, which would result in high potential for environmental impacts (hydrology and water resources, biology and wetlands, visual impacts, and Section 4(f) and 6(f) parkland impacts.

- **I-880 Alignment Alternative**: From Oakland, this alignment alternative would follow I-880 south to San Jose.[1]

The I-880 alignment alternative would require acquisition of considerable right-of-way in the more northern area to be able to expand the highway sufficiently to allow for high-speed tracks in the median. The I-880 alignment alternative would be mostly an aerial configuration requiring construction of footings within the highway right-of-way and lane closures during construction. This likely would require off-peak construction, which is time consuming and costly. Where the highway is narrow (Oakland to Fremont), adding high-speed rail would require full median widening and would present right-of-way issues similar to major highway reconstruction (demolition of existing adjacent property, new noise walls, demolition of existing noise walls, construction of new highway lanes, and maintenance of traffic). This alternative would have high capital costs and substantial right-of-way constraints, making it impracticable.

Former WPRR Rail Line through Niles Junction to Mulford Line Alignment Alternative (WPRR/Niles/Mulford alignment): From Oakland, this alignment alternative would follow the former WPRR Rail Line onto the UPRR's Hayward Line, to UPRR's Niles Line, and then UPRR's Mulford Line.

This alignment alternative would be nearly entirely on an aerial structure that would create a substantial visual impact. The WPRR alignment alternative would have major construction issues making it impracticable, including rearrangement of BART foundations to allow for the high-speed alignment to pass from one side of BART to the other. In contrast, the proposed alignment alternative along the UPRR Hayward Line would be at grade and would follow the existing freight and commuter railroad.

The southern portion of this alignment alternative goes through the Don Edwards National Wildlife Refuge, which would result in high potential for environmental impacts (hydrology and water resources, biology and wetlands, visual impacts, and Section 4(f)/6(f) parkland impacts).

1 Only the Oakland to Fremont segment of the I-880 option would be eliminated since the Fremont to San Jose portion is part of the Hayward/I-880 option carried forward for further evaluation.

Hayward Line via tunnel to Mulford Line Alignment Alternative (Hayward/Tunnel/Mulford alignment): From Oakland, this alignment alternative would follow south along UPRR's Hayward Line (Niles Subdivision) to a tunnel leading to UPRR's Mulford Line.

The tunnel alignment alternatives in Fremont have high projected costs, and the tunnel section would result in considerable right-of-way constraints, making this alignment alternative impracticable. The purpose of a tunnel would be to improve travel times and eliminate tight curves. However, eliminating tight curves would result in tunnel alignments through the City of Fremont that do not follow existing transportation rights-of-way. This alignment alternative would not be compatible with the existing development and would have considerable seismic constraints.

The southern portion of this alignment alternative goes through the Don Edwards National Wildlife Refuge, which would result in high potential for environmental impacts (hydrology and water resources, biology and wetlands, visual impacts, and Section 4(f)/6(f) parkland impacts).

Former WPRR Rail Line via tunnel to Mulford Line Alignment Alternative (WPRR/Tunnel/Mulford alignment): From Oakland, this alignment alternative would follow the former WPRR rail line, transitioning to UPRR's Hayward Line, then to a tunnel leading to UPRR's Mulford Line.

The tunnel alignment alternatives in Fremont have high projected costs, and the tunnel section would result in considerable right-of-way constraints making this alignment alternative impracticable. The purpose of a tunnel would be to improve travel times and eliminate tight curves. However, eliminating tight curves would result in tunnel alignments through the City of Fremont that would not follow existing transportation right-of-way. This alternative would not be compatible with the existing development and also has considerable seismic constraints.

Hayward Branch through Niles to Mulford Line Alignment Alternative (Hayward Line/Niles/Mulford Alignment): From Oakland, this alignment alternative would travel south along UPRR's Hayward Line to UPRR's Niles Line and then onto UPRR's Mulford Line.

This alignment alternative goes through the Don Edwards National Wildlife Refuge, which would result in high potential for environmental impacts (hydrology and water resources, biology and wetlands, visual impacts, and Section 4(f)/6(f) parkland impacts). This alignment alternative would also require tight curves that would greatly limit operational speeds between Union City and Newark—express travel times would be at least 6 minutes longer than the Hayward Line/I-880 alignment alternative.

Former Western Pacific Railroad (WPRR) Rail Line to Hayward Line to I-880 Alignment Alternative (WPRR alignment/Hayward/I-880): From Oakland, this alignment alternative would follow the UPRR (former WPRR) rail line transition to UPRR's Hayward Line and then transition to I-880.

This alignment alternative would be nearly entirely on an aerial structure that would create substantial visual impacts. The WPRR alignment alternative would have considerable construction issues making it impracticable, including the rearrangement of San Francisco BART foundations to allow for the high-speed alignment to pass from one side of BART to the other. In contrast, a proposed alignment alternative along the UPRR Hayward Line (Niles Subdivision) would be at grade and would follow the existing freight and commuter railroad.

Former WPRR Rail Line Alignment Alternative (Warm Springs to San Jose): The former WPRR (the Milpitas subdivision) has been sold to the Santa Clara Valley Transportation Authority (VTA) for the BART link between Warm Springs to San Jose. This right-of-way is relatively narrow, with some sections at approximately 60 feet. Purchase of additional ROW necessary to widen the corridor sufficiently for both the planned San Jose BART extension and an HST alignment alternative with full grade separation

would result in acquisition and relocation of numerous residential and industrial land uses with corresponding significant impacts. Because alignment alternatives exist that would not result in these adverse relocation impacts, this WPRR alignment alternative is not viewed as practicable.

Moreover, as the WPRR alignment alternative passes south of U.S. 101, it does not lead directly to the Diridon Station but rather loops to the south of Downtown San Jose. Extensive tunneling through San Jose (essentially paralleling the proposed BART extension) would be required for this alignment alternative to serve the Diridon Station directly. The alignment alternative would need to tunnel under both the proposed BART and the existing Vasona light rail transit (LRT) tunnels and would arrive at the station perpendicular to the other rail lines (Caltrain, Capital Corridor, ACE, etc.).

Tunneling under BART and the LRT tunnels (that are more than 50 feet below ground–top of rail) would make the HST platform very deep (greater than 80 feet to top of tunnel), thus resulting in a loss in convenience for station connectivity. Note that this perpendicular arrangement—parallel to BART—could only be used with the Altamont Pass alignment alternatives.

Tail tracks would be necessary for this stub end arrangement. Finding sufficient room for this perpendicular stub-end HST platform and the requisite tail tracks would be extremely difficult if not impossible given the current light rail tunnel and station, the proposed BART tunnel and station, and the current and anticipated future land uses and development in the Diridon Station area.

Tunnel under Fremont Central Park Alignment Alternative: An extension of the former WPRR south to connect with the I-880 alignment alternative would require tunneling under the lake in Fremont Central Park. This alignment alternative is not practicable because it requires tunneling at the point where this alignment alternative is crossed by the Hayward Fault. This alignment alternative would also have Section 4(f)/6(f) parkland impacts because it bisects (in tunnel) Fremont Central Park.

2-G.1.2.2 Station Locations

The following station location options were considered and eliminated in the Oakland to San Jose section.

- Oakland Terminus Stations
  - **Lake Merritt:** The Lake Merritt station location option would result in a high level of potential adverse effects in residential areas. Residential uses would be near this potential station site, whereas land uses adjacent to the potential Jack London Square and the City Center station sites are more commercial in nature. The Lake Merritt Station and alignment alternative would require construction of a tunnel or subway through the campus of Laney College adjacent to the BART alignment. The Lake Merritt alternative does not meet the program objectives because it would not be compatible with existing development and would not provide sufficient connectivity and accessibility to serve the East Bay.
  - **Jack London Square:** The Jack London Square Station and alignment alternative leading to and from it would be in bored tunnels in the bay mud underneath the Embarcadero and the active UPRR tracks. Relocating the railroad even temporarily not feasible. A cut-and-cover access would need to be constructed within the Amtrak parking lot, and a concourse would need to be excavated over the bored tunnels. This station location option would have the most geologic challenges and soils constraints of the Oakland terminus station location options. A terminus HST station at Jack London Square would be difficult to construct and would be the most costly option to serve Oakland. Although the Jack London Square location would serve a thriving commercial center and could provide a direct link to Amtrak, this terminus would not provide a connection with BART. This option is impracticable because of logistical constraints, and it would not meet program objectives because it would not connect with BART to provide accessibility and connectivity for the East Bay.

- Oakland Airport/Coliseum Stations
  - **I-880 Hegenberger:** This potential station site would only serve the I-880 (entire segment) alignment alternative that has been eliminated from further investigation.
- South Alameda County Stations
  - **Mowry Avenue:** This potential station site would only serve the I-880 (entire segment) alignment alternative that has been eliminated from further investigation.

2-G.1.3 San Jose to Central Valley

The alignment alternatives and station location options eliminated from further consideration in this corridor are described below (Figure 2.G-3).

2-G.1.3.1 Diablo Range Direct Alignment Alternatives

- **Merced Southern Alignment Alternative (Central Valley portion):** This alignment alternative would extend from the eastern base of the Diablo Range through the San Joaquin Valley to Merced (at a Merced Municipal Airport Station).

The southern variation of the Diablo Range direct alignment alternative has been eliminated from further investigation because of potential environmental impacts. The southern alignment alternative would pass through approximately 4.4 mi (7 km) of sensitive wetlands, including the San Luis National Wildlife Refuge. It would also pass through floodplains, farmlands of statewide importance, and sensitive habitats. Diablo Range direct alignment alternatives would use an alignment north of the San Luis National Wildlife Refuge that would minimize environmental impact.

- **Direct Tunnel Alignment Alternative (northern or southern connection to Merced):** This alignment alternative would have a station at the existing San Jose (Diridon) Station heading south on the Caltrain/UPRR just north of I-85, turning east into a long (31 mi [49.6 km]) tunnel to San Joaquin Valley to Merced (near Castle Air Force Base [AFB]).

The direct tunnel alignment alternative would cross three active and potentially active fault areas in a tunnel, including the Ortigalita fault, the southern extension of the Greenville fault trend, and the Calaveras fault zone. The direct tunnel alignment alternative is likely to cost at least $3 billion more than the minimize tunnel alignment alternative, which would use a 3.5% gradient to minimize tunneling. This higher cost would be due largely to the long tunnel and the high unit cost per mile associated with tunnels that exceed 6 mi (9 km) in length. The direct tunnel concept would involve construction of a tunnel that would be among the longest in the world (31 mi [49.6 km]) through mixed soil and geology types. The results of the Authority's technical tunnel conference indicated that, while not impossible, a tunnel of this length in California would be extremely expensive to construct, operate, and maintain, and would therefore be impracticable.

- **Diablo Range Direct Alignment Alternatives (Northern Tunnel, Minimize Tunnel, & Tunnel Under Park):** These alignment alternatives would have a station at the existing San Jose (Diridon) Station heading south on the Caltrain/UPRR, just north of I-85 turning east through the Diablo Range to the San Joaquin Valley to reach Merced using the northern alignment alternative (near Castle AFB). Three alignment alternatives were developed to better define this general corridor: the northern tunnel, minimize tunnel, and tunnel under park.

HST alignment alternatives through (or under) Henry Coe State Park (which includes the Orestimba State Wilderness Preserve) would have greater potential environmental impacts than alignment alternatives that would avoid the park. Alignment alternatives through Henry Coe State Park would have the highest impacts to Section 4(f)/6(f) Resources (both long-term and short-term [construction] impacts). In

addition, the considerable amount of public and agency input in regards to these alignment alternatives has been overwhelmingly opposed to any construction through Henry Coe State Park. The Diablo Range direct alignment alternatives have been eliminated from further investigation because of potential environmental impacts and constructability concerns.

The northern tunnel alignment alternative would have high potential impacts to the natural environment, including habitat fragmentation and visual, noise, and high value aquatic resources. Construction of an alignment alternative through this remote area would bisect sensitive ecosystems in an alignment that does not follow an existing transportation corridor across the Mt. Hamilton/Diablo Range. The EPA's scoping comments recommend eliminating from further analysis "any alternatives that impact the designated aquatic resources of national importance in Del Puerto Creek, Salado Creek, Crow Creek, and Orestimba Creek watersheds in the Diablo Range." Any alignment alternative through the Diablo Range north of Henry Coe State Park will impact these resources. The EPA also stated, "Considering the high value aquatic resources and the potential for large scale habitat fragmentation, EPA continues to believe that the Diablo Direct alignments do not appear to exhibit characteristics of the LEDPA, the only alternative that can be permitted under the CWA Section 404 regulations (40 CFR 230.10 (a) and (c))." Scoping comments from the California Department of State Parks say, "Habitat degradation and wildlife corridor fragmentation between SPS units and other open space lands, such as The Nature Conservancy's Mount Hamilton Project conservation lands, are two of our highest concerns." US Department of the Interior Fish and Wildlife Service scoping comments state, "The portion of the Diablo Range to be impacted by these proposed crossings has been recognized for its important natural resources," and "there are significant natural resource concerns related to the proposed Northern Mountain crossings. The Diablo Range alignments would result in substantial direct and indirect impacts to federally listed wildlife species in the region, including the endangered kit fox, the threatened California red-legged frog, the threatened bay checkerspot butterfly, and the threatened California tiger salamander, as well as various threatened and endangered plant species." In addition, the considerable amount of input from the public and organizations and other agencies in regards to this portion of the Diablo Range north of Henry Coe State Park has been overwhelmingly opposed to any construction through this area because of potential environmental impacts to this remote and environmentally sensitive area.

2-G.1.3.2 Pacheco Pass Alignment Alternatives

- **Caltrain/Morgan Hill/Foothill/Pacheco Pass Alignment Alternative:** This alignment alternative would extend south along the Caltrain/UPRR rail corridor, traveling south in the foothills east of US-101 through the Pacheco Pass and the San Joaquin Valley.

The Caltrain/Morgan Hill/Foothill/Pacheco Pass alignment alternative is the least costly of all alignment alternatives in this section, primarily due to less tunneling and its shorter length compared to the other Pacheco Pass alignment alternatives. However, this alignment alternative would have potentially substantial impacts on sensitive habitat (through the foothills) and would have high visual impacts. This new transportation corridor through the foothills would not be compatible with existing and planned development; would result in potentially severe impacts on the existing suburban, rural, and open space areas in the foothills; and would provide minimal connectivity and accessibility. It would not link to the Caltrain commuter rail service south of San Jose. The Caltrain/Morgan Hill/Foothill/Pacheco Pass alignment alternative would not meet basic program objectives and project purpose because it would have poor compatibility with development and insufficient connectivity and accessibility.

- **Caltrain/Morgan Hill/East 101/Pacheco Pass Alignment Alternative**: This alignment alternative would extend south along the Caltrain/UPRR rail corridor, transitioning to south US-101 east through the Pacheco Pass and the San Joaquin Valley.

The Caltrain/Morgan Hill/East 101/Pacheco Pass alignment alternative is similar to the Caltrain/Morgan Hill/Pacheco Pass alignment alternative, with the exception that it would use the US-101 corridor to

connect to the Caltrain corridor north of Morgan Hill as opposed to south of Morgan Hill. This alignment alternative would not meet basic program objectives and project purpose because it would have poor compatibility with development and insufficient connectivity and accessibility. This alignment alternative would not provide a direct link to the Caltrain commuter rail service south of San Jose. This alignment alternative would pass through the longest length of floodplain of all the Pacheco Pass alignment alternatives.

- **Morgan Hill/Caltrain/Pacheco Pass Alignment Alternative**: This alignment alternative would extend south along the Caltrain/UPRR rail corridor through the Pacheco Pass and San Joaquin Valley. Station options include the existing San Jose (Diridon) Station, and Morgan Hill (near the existing Caltrain Station).

Although an alignment alternative bypassing Gilroy to the east might have positive attributes, there is no existing transportation corridor or other useable undeveloped potential right-of-way linking the Pacheco Pass directly to Morgan Hill through the Santa Clara Valley east of the Caltrain alignment. Any alignment alternative through this area would result in considerable property impacts with the development of a new HST corridor. The Morgan Hill/Caltrain/Pacheco Pass alignment alternative was eliminated because of potential environmental impacts.

2-G.1.3.3 San Jose to Merced

The following station location options were considered and eliminated between San Jose and Merced.

Morgan Hill (Foothills): This potential station location option would only serve the Pacheco Pass/Foothills/Morgan Hill/Caltrain alignment alternative that has been eliminated from further investigation. This station location option would have poor connectivity and accessibility and not meet the basic program objectives.

Morgan Hill (East of 101): This potential station location option would only serve the Pacheco Pass/East of 101/Caltrain alignment alternative that has been eliminated from further investigation. This station location option would have poor connectivity and accessibility and not meet the basic program objectives.

- **Los Banos:** A HST station location option at Los Banos (Western Merced County) would have low intercity ridership, limited connectivity and accessibility, and potential impacts to water resources and threatened and endangered species. Although the City of Los Banos supports the Pacheco Pass alignment alternative with a potential station location option at Los Banos, considerable public and agency opposition has been expressed about this station location option because of its perceived potential to result in growth related impacts. This station location option (as well as the Visalia/Hanford station location option) has low ridership potential compared to other potential station location options investigated by the Authority. In 2020, this station location option is forecast to serve a population of only about 88,000 (forecast to only have between 155,000 and 190,000 annual total intercity boardings and alightings by 2020). This station location option would have poor connectivity and accessibility and, with potential for environmental impacts, would not meet the basic program objectives.

2-G.1.4 East Bay to Central Valley

The alignment alternatives and station location options eliminated from further consideration in this corridor are described below (Figure 2.G-4).

- **SR-84/South of Livermore Alignment Alternative:** This alignment alternative would extend east near the UPRR alignment alternative through Niles Canyon then follow the SR-84 corridor south

of Pleasanton and Livermore and continue east (south of Livermore) to the Patterson Pass corridor and to Tracy. Station location options include the Pleasanton (I-680/SR-84) station or Livermore (South Isabel).

The SR-84/South of Livermore alignment alternative was eliminated from further investigation because it would have high potential impacts to the natural environment and to agricultural lands. This alignment alternative would cut through agricultural areas and undeveloped conservation easements, increasing habitat fragmentation. The SR-84/South of Livermore alignment alternative would have greater potential impacts to high value aquatic resources and threatened and endangered species than other alignment alternatives through the Tri-Valley (Livermore, Pleasanton, and Dublin) area.

In the mid 1980s, citizens approached Alameda County about a plan allowing for agriculture to be preserved and reinvigorated. The county responded with a plan that requires land to be put under easement for agricultural use to offset housing developments in the southern half of the valley. The South Livermore Valley Area Plan that was adopted several years later requires developers to find or plant an acre of cultivatable agriculture for every lot that was built up and for every acre covered with housing. The easements were put into the hands of the South Livermore Valley Area Trust, now the Tri-Valley Conservancy, which holds them in perpetuity. There are 3,059 agricultural acres in 30 properties under easement, mostly vineyards, olive groves, and grazing. There is one non-agricultural easement of 371 acres of parkland. Figure 2-D-5 shows the location of the SR-84/South of Livermore alignment alternative and its relation to the easements as they existed in 2002.

There are several state and federal Endangered Species Act concerns associated with the SR-84/South of Livermore alignment alternative. Due to the more undeveloped setting of this alignment alternative, there is a higher likelihood of adverse effects to protected species including creation of a barrier to migration for California tiger salamanders and California red-legged frog. This area is the northern range of the San Joaquin kit fox; and therefore this alignment alternative may also create a barrier to movement by the San Joaquin kit fox. Barriers to movement fragment remaining habitat for these species, leading to greater population isolation and possible species loss. There is also a greater potential for effects to Alameda whipsnakes in the Sunol Valley area and listed branchiopods (fairy shrimp) along this alignment alternative. The Sunol Valley is the only likely connection between two large populations of the Alameda whipsnakes that could be adversely affected by the high speed rail line, which would create another barrier/hazard. In addition, the construction of this alignment alternative through the undeveloped and rural open-space and agricultural areas would introduce a higher likelihood for adverse affects on aquatic resources, particularly when compared to the other alignment alternatives for the Tri-Valley area that are within existing rail or freeway rights-of-way.

The SR-84/South of Livermore alignment alternative would by-pass the existing urbanized areas of Livermore, Pleasanton, and Dublin and is remote with respect to the existing BART and Altamont Commuter Express routes. As such, it would not be feasible to provide regional or longer-distance services which would provide convenient access to downtown Livermore or Pleasanton. Candidate station location options along this segment would not support transit-oriented development as well as downtown stations. Development of a transfer point with BART on the SR-84/South of Livermore alignment alternative would not be feasible without a significant extension of the BART line.

- **SR-84/I-580/UPRR Alignment Alternative:** This alignment alternative would extend east near the UPRR alignment alternative through Niles Canyon then follow the SR-84 corridor south of Pleasanton and Livermore and turn north to connect to the I-580/UPRR Alignment alternative through the Altamont Pass to Tracy. Station options include the Pleasanton (I-680/SR-84) Station, or Livermore (Greenville), and Tracy (downtown) or Tracy (ACE).

- **SR-84/I-580/UPRR Alignment Alternative:** This alignment alternative was eliminated from further investigation because it would have high potential impacts to the natural environment and agricultural lands. This alignment alternative would have the same issues as presented for the SR-84/South of Livermore alignment alternative (see above).

- **I-580 Bay Fair to Pleasanton Alignment Alternative:** This alignment alternative would extend east along the I-580/BART corridor from Bay Fair to Pleasanton.

The I-580 from Bay Fair to Pleasanton alignment alternative was eliminated from further investigation because it was found to be impracticable due to engineering and construction complexity and logistical and right-of-way constraints. Moreover, the removal of existing and growing transit services associated with this alignment alternative conflicts with the purpose and need and objectives of the HST system.

The I-580 median between Bay Fair and Pleasanton is occupied by the BART system. There are two existing stations: Castro Valley and the Dublin/Pleasanton Station. A future "infill" station is presently under design for West Dublin. This station will be located just west of the I-680 overcrossing. The present and future stations are all center platform type stations with fairly narrow widths.

The HST alignment alternative in this corridor would *replace* the existing BART system with high-speed and regional rail infrastructure and service resulting in significant impacts to the existing operating BART system between the Pleasanton/East Dublin terminus and Bay Fair stations for a number of years to allow for the decommissioning of BART, construction of the new infrastructure, and testing and commissioning of the new service. A practical construction schedule including removal of the existing BART infrastructure, foundation and aerial structure placement, trackwork installation, electrification, and testing and startup would be 3 to 4 years in duration. Steps could be taken to provide limited BART services during portions of the construction period (particularly during the early phases of construction including the removal of BART); however, because the end result is replacement of the system, it is unlikely that these steps would result in eliminating a significant full closure period (see potential construction schedule shown in Figure 2-D-6).

The removal of existing and growing transit services conflicts with the purpose and need and objectives of the HST system (i.e., "improve public transportation systems and services" or "enhance efficient operation of transportation facilities and service"). The completion of the existing Dublin Pleasanton Extension (DPX) to the BART system represents an infrastructure investment of over $500 million dollars of public funds and a 6-year construction effort. In addition to the impacts to BART, there would be impacts to the existing freeway facility to accommodate various construction phases, potentially narrowing and shifting existing lanes.

This HST alignment alternative is impracticable because, due to the presence of the existing I-580/I-680 freeway-to-freeway interchange and the proposed new connector ramp at the fourth level, the HST express tracks would need to be constructed along a continuously high (80 feet or more) aerial structure at the fifth level through the interchange area and for nearly one mile in either direction to accommodate high speed operation. Logistical constraints to the construction of such a structure make this alignment alternative impracticable.

Additional right-of-way would also be required for station location options and connections (crossovers) between tracks. It would be impracticable to secure these areas of additional right-of-way since I-580 would have to be relocated and reconstruction and significant areas of existing land uses would be displaced. The median of I-580 is approximately 60 to 70 feet wide. Station platforms and tracks would need to be 90 to 100 feet wide. Crossovers between the express tracks (aerial) and the regional rail tracks (at-grade) would require up to 60 feet of additional right-of-way for up to one mile in length at one or more locations along this segment to provide sufficient capacity and reliability.

To connect the HST from the I-580 Corridor to the south, the HST would have to pass through an established neighborhood in an aerial configuration, bisecting the community. In addition, operating speeds would be highly constrained (<100mph) through significant portions of the alignment alternative due to numerous restrictive curves in many sections. The existing BART system was designed within the I-580 median for operational speeds of up to 75 mph.

Considering these significant concerns, the portion of the I-580 alignment alternative extending through the I-580/I-680 interchange and extending west to Hayward (Bay Fair) was eliminated from further consideration as impracticable and for failing to meet the purpose and need and objectives of the HST system while the I-580/I-680/UPRR alignment alternative received further study.

2-G.1.4.1 Station Locations

The following station location options were considered and eliminated because they were located on the eliminated alignment alternative.

- **Pleasanton (I-680/SR-84):** This potential station location option would serve the Altamont SR-84/South of Livermore alignment alternative or the SR-84/I-580/UPRR alignment alternative.
- **Livermore (Isabel/SR-84):** This potential station location option would serve the Altamont SR-84/South of Livermore alignment alternative.
- **Pleasanton (I-680/SR-84):** This potential station location option would serve the Altamont SR-84/South of Livermore alignment alternative or the SR-84/I-580/UPRR alignment alternative.
- **Livermore (Greenville Road/SR-84):** This potential station location option would serve the Altamont SR-84/I-580/UPRR.

2-G.1.5 Central Valley

The alignment alternatives and station location options eliminated from further consideration in this corridor are described below (Figure 2.G-7).

- **West of State Route 99 Alignment Alternative**: Alignment alternatives creating a "new" transportation corridor west of SR-99 through undeveloped land.

Creating a new transportation corridor to the west of SR-99 would require cutting through mostly agricultural lands 2 to 5 miles west of SR-99. These alignment alternatives would result in increased potential impacts on agricultural lands and natural resources (including wetlands, water resources, floodplains, and habitat) and would have high severance impacts through the Central Valley. The concept of locating the HST system along an existing rail corridor to the greatest extent possible through the Central Valley was selected in the Program EIR/EIS for the HST System (Authority and FRA, 2005) and was supported by comments received from federal, state, and local agencies as well as the public. These same entities were generally opposed to the creation of a new transportation corridor in undeveloped portions of the Central Valley. Alignment alternatives to the west of SR-99 (and any potential outlying stations associated with those alignment alternatives) were eliminated from further consideration because they would not avoid or substantially reduce potential environmental impacts and because they would not meet basic project purpose and objectives.

- **East of State Route 99 Alignment Alternative**: Alignment alternatives creating a "new" transportation corridor east of SR-99 through undeveloped land.

Creating a new transportation corridor to the east of SR-99 would require cutting through mostly agricultural lands 2 to 5 miles to the east of SR-99. These alignment alternatives would result in increased potential impacts on agricultural lands and natural resources (including wetlands, water

resources, floodplains, and habitat) and would have high severance impacts through the Central Valley. The concept of locating the HST system along an existing rail corridor to the greatest extent possible through the Central Valley was selected in the Program EIR/EIS for the HST System (Authority and FRA, 2005) and was supported by comments received from federal, state, and local agencies as well as the public. These same entities were generally opposed to the creation of a new transportation corridor in undeveloped portions of the Central Valley. Alignment alternatives to the east of SR-99 (and any potential outlying stations associated with those alignment alternatives) were eliminated from further consideration because they would not avoid or substantially reduce potential environmental impacts and because they would not meet basic project purpose and objectives.

2-G.1.5.1 Station Locations

The following station location options were considered and eliminated in the Central Valley section.

- **Modesto West:** This potential station location option would serve the west of State Route 99 alignment alternative that has been eliminated.
- **Merced West:** This potential station location option would serve the west of State Route 99 alignment alternative that has been eliminated.
- **Empire:** This potential station location option would occupy portions of a BNSF rail yard in the Empire Section of Modesto. This station location option is on the BNSF alignment south of the Amtrak Briggsmore alignment alternative. This proposed station site would not meet the project objectives because it is not compatible with existing or planned development. In addition, it would have insufficient connectivity and accessibility and would be subject to freight rail interaction and potential conflicts.
- **Modesto East:** This potential station location option would serve the east of State Route 99 alignment alternative that has been eliminated.
- **University:** This potential station location option would serve the east of State Route 99 alignment alternative that has been eliminated. In addition, the station location option would impact proposed development areas; threatened and endangered species; and a considerable amount of farmlands, wetlands, and flood prone areas.
- **Plainsburg:** This potential station location option would serve the east of State Route 99 alignment alternative that has been eliminated.

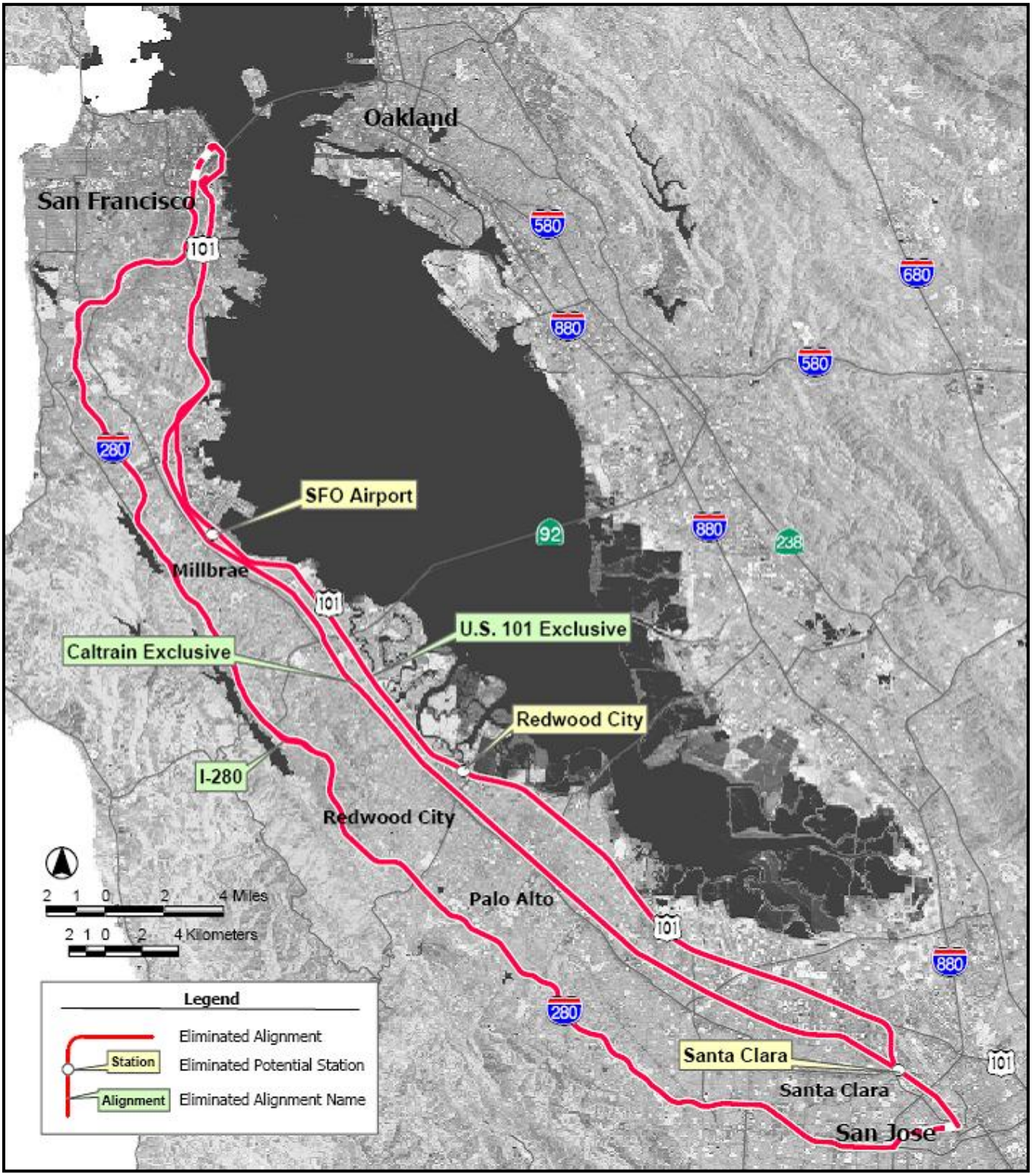

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Figure 2.G-1
San Francisco to San Jose—Alignment Alternatives and Station Location Options Considered but Eliminated from Further Consideration

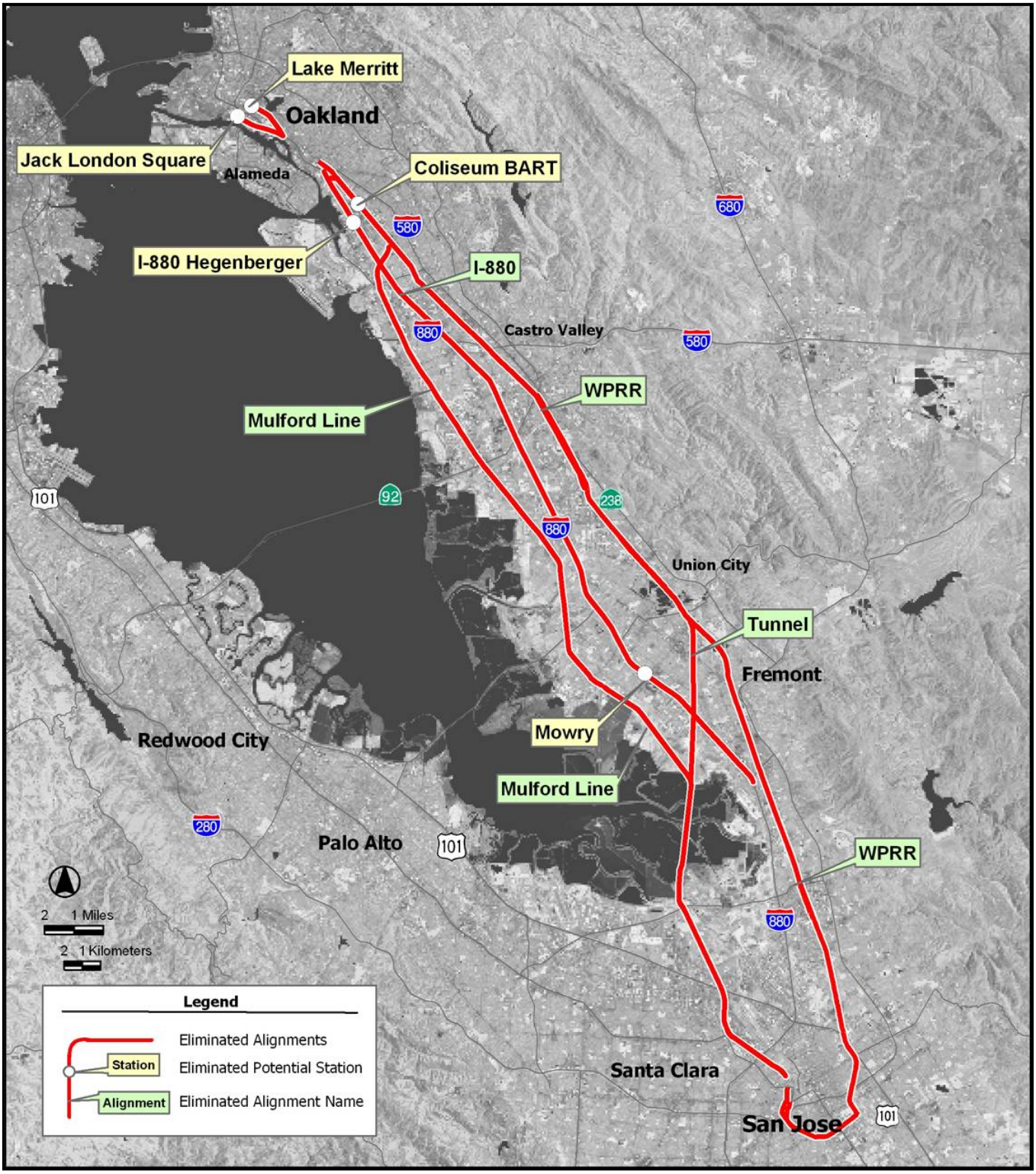

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Figure 2.G-2
Oakland to San Jose—Alignment Alternatives and Station Location Options Considered but Eliminated from Further Consideration

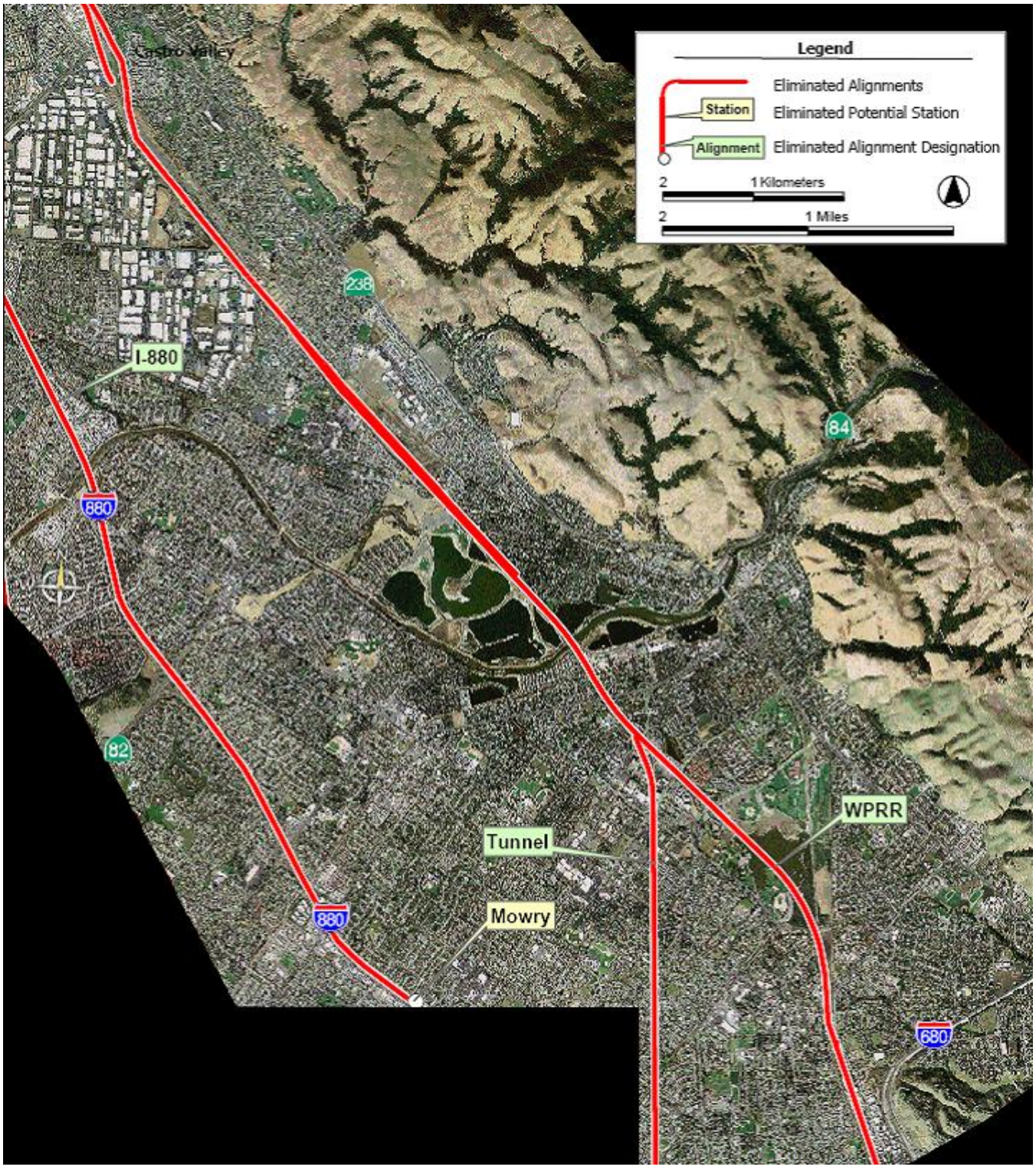

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Figure 2.G-2A
Niles Junction—Alignment Alternatives and Station Location Options Considered but Eliminated from Further Consideration

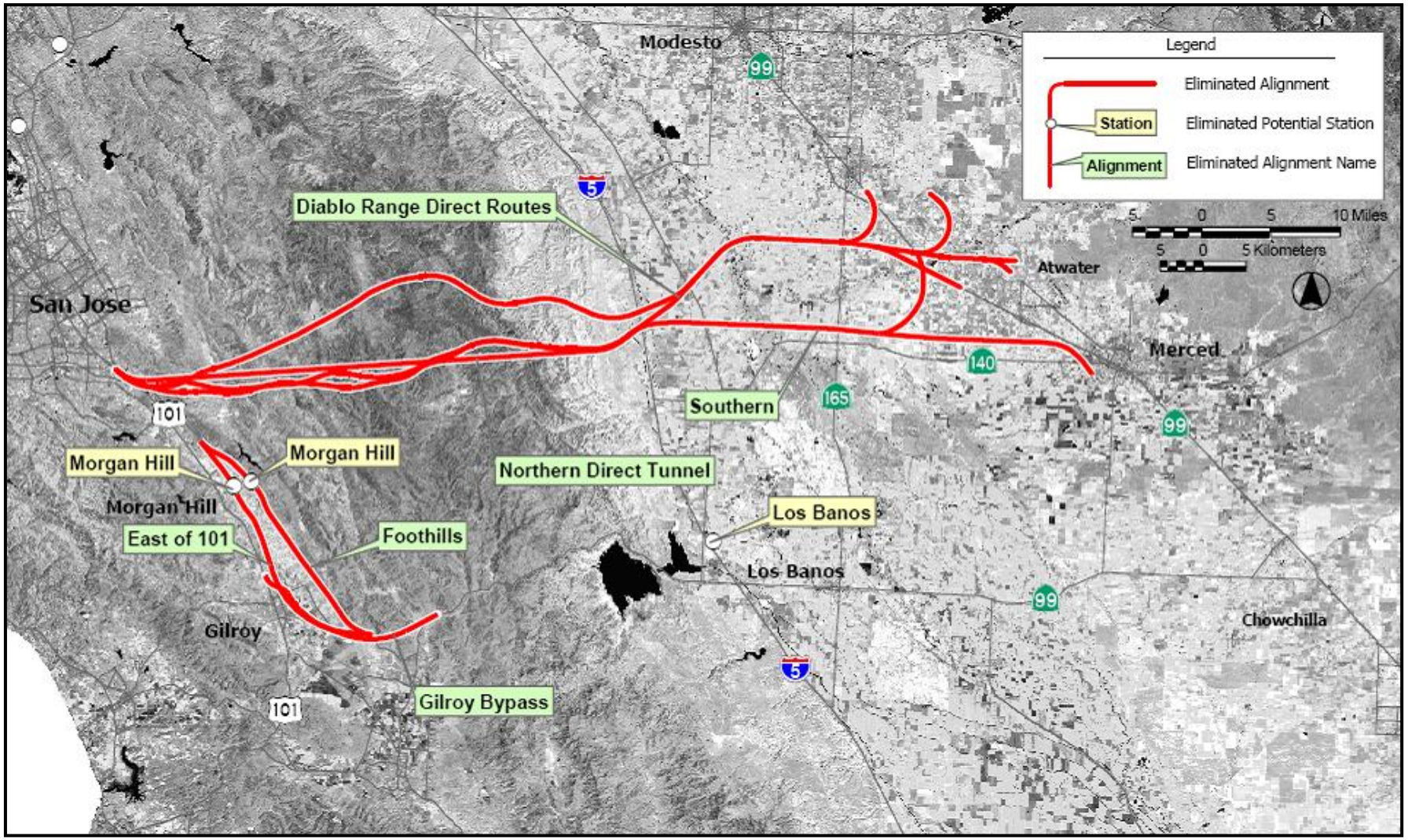

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Figure 2.G-3
San Jose to Central Valley—Alignment Alternatives and Station Location Options Considered but Eliminated from Further Consideration

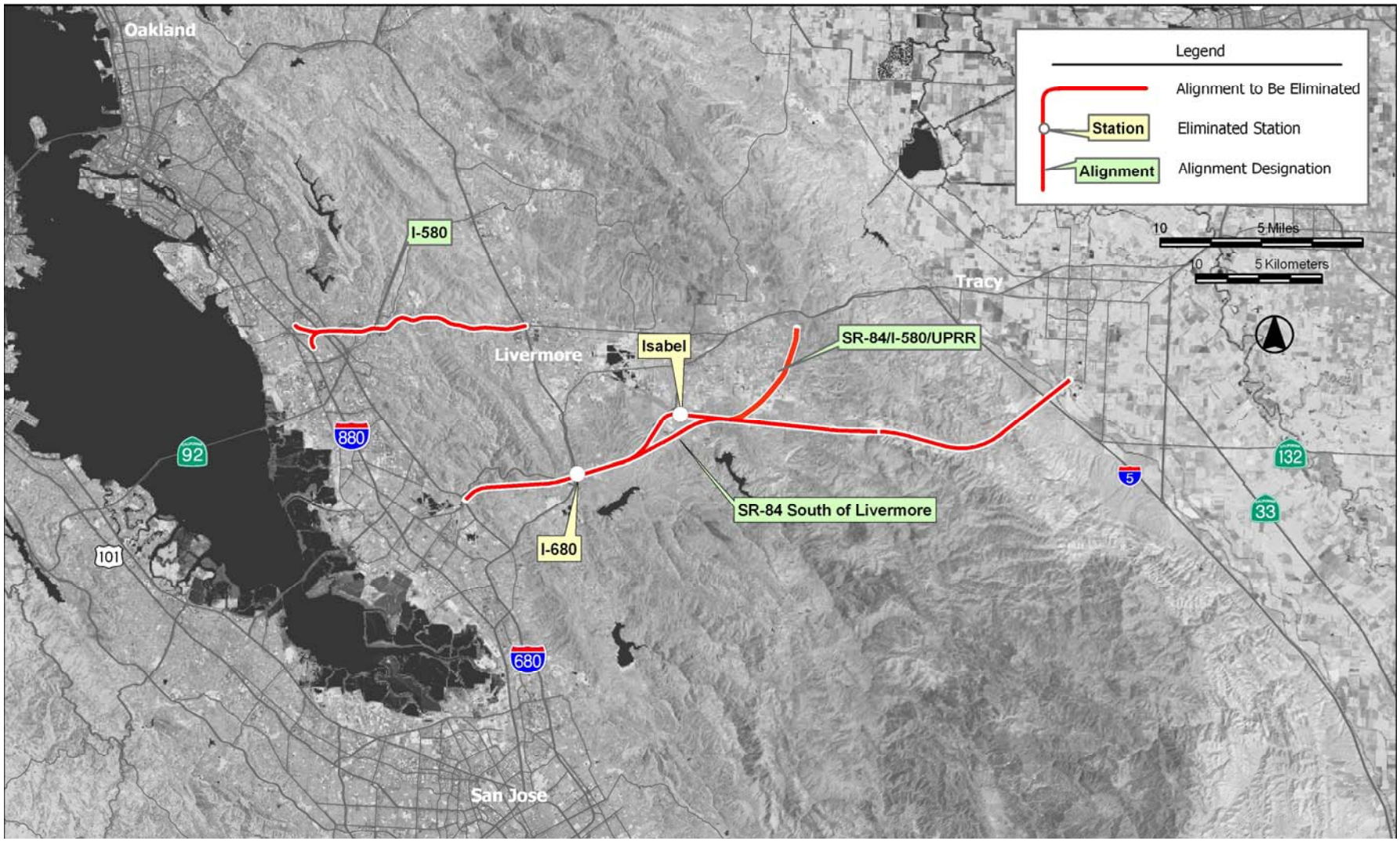

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Figure 2.G-4
East Bay to Central Valley—Alignment Alternatives and Station Location Options Considered but Eliminated from Further Consideration

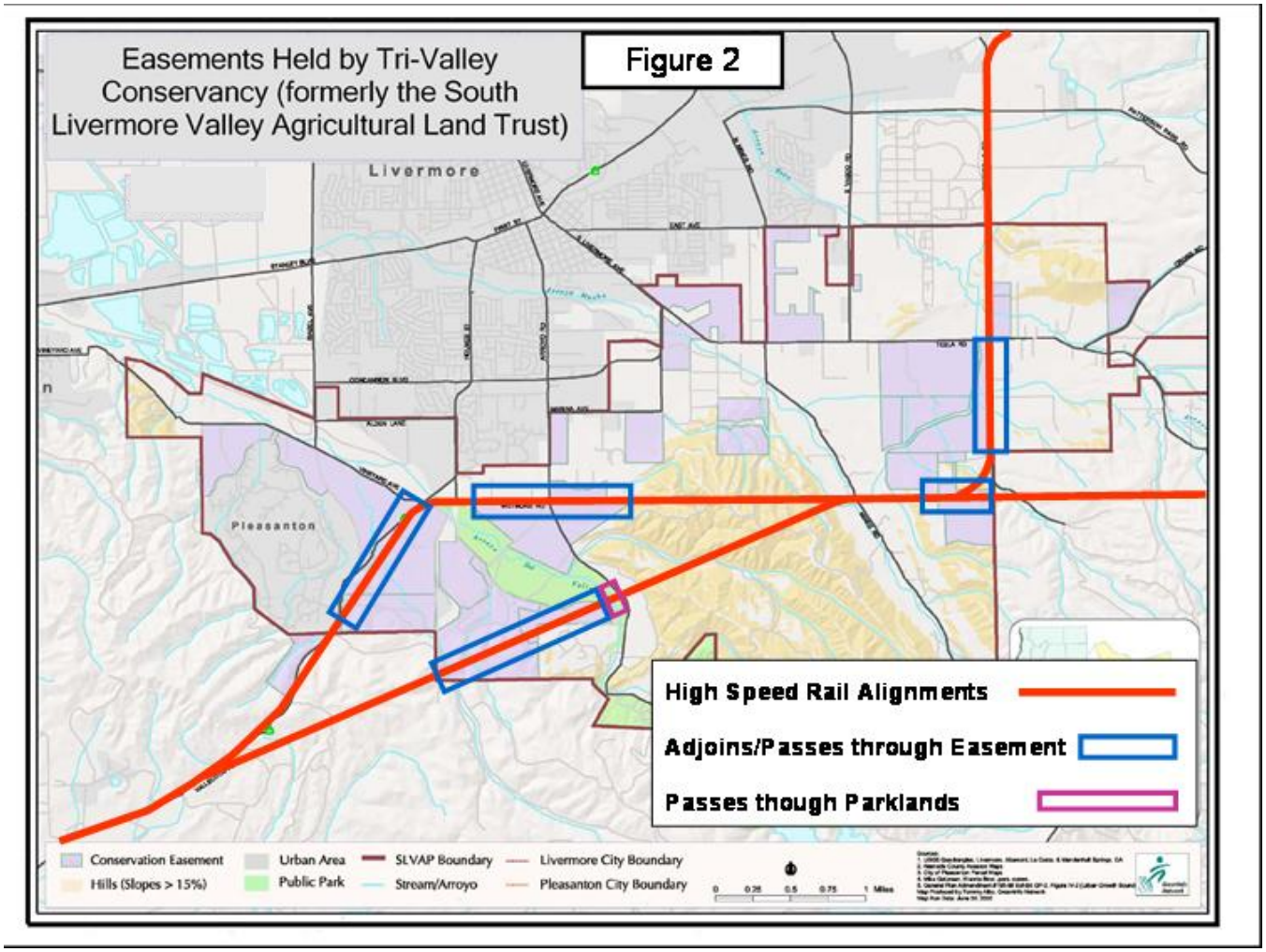

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Figure 2.G-5
Easements and Parklands Impacts
Vicinity of Livermore

Best Case Construction Schedule

Replacement of Dublin-Pleasanton BART with Proposed HSR

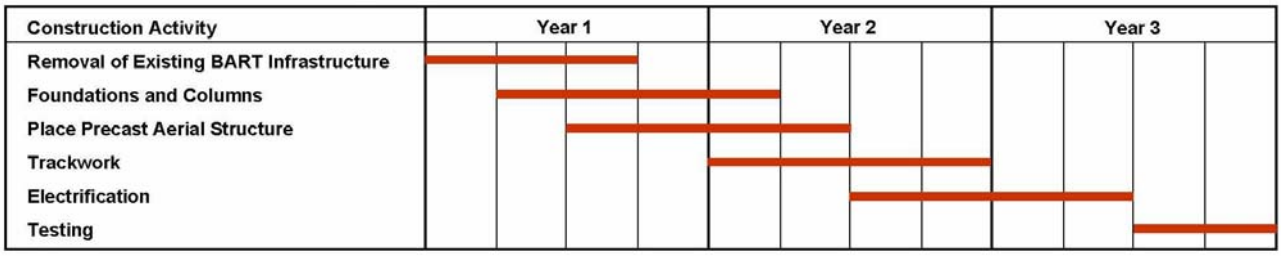

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Figure 2.G-6
Best Case Construction Schedule

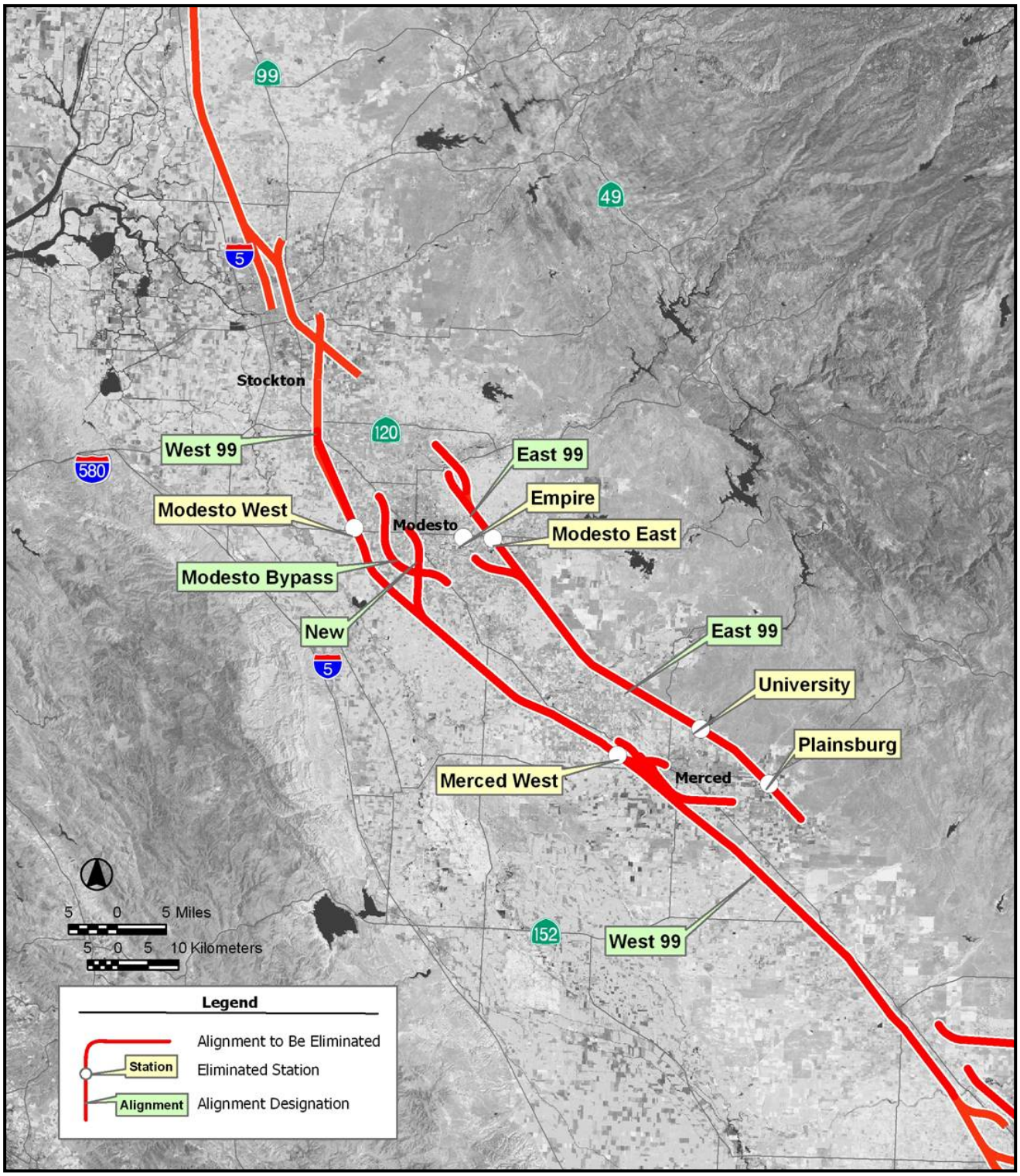

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Figure 2.G-7
Central Valley—Alignment Alternatives and Station Location Options Considered but Eliminated from Further Consideration